PORTFOLIO OF COMPOSITIONS:
COMPOSITIONS OF INDETERMINACY AND PREDETERMINACY

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Abstract

A portfolio of three compositions - *2494.8 cm*^{2}, a graphic score; *Stjepan + Natalia*, a piano duet composed using serial practices; and *Satellites*, and acousmatic work, all concerned with the use of indeterminacy or predeterminacy in either their composition or performance. The accompanying commentary describes the ideas behind and processes of creating these works, with an accompanying CD containing recordings of four realisations of *2494.8 cm*^{2}, and the acousmatic work *Satelittes*.

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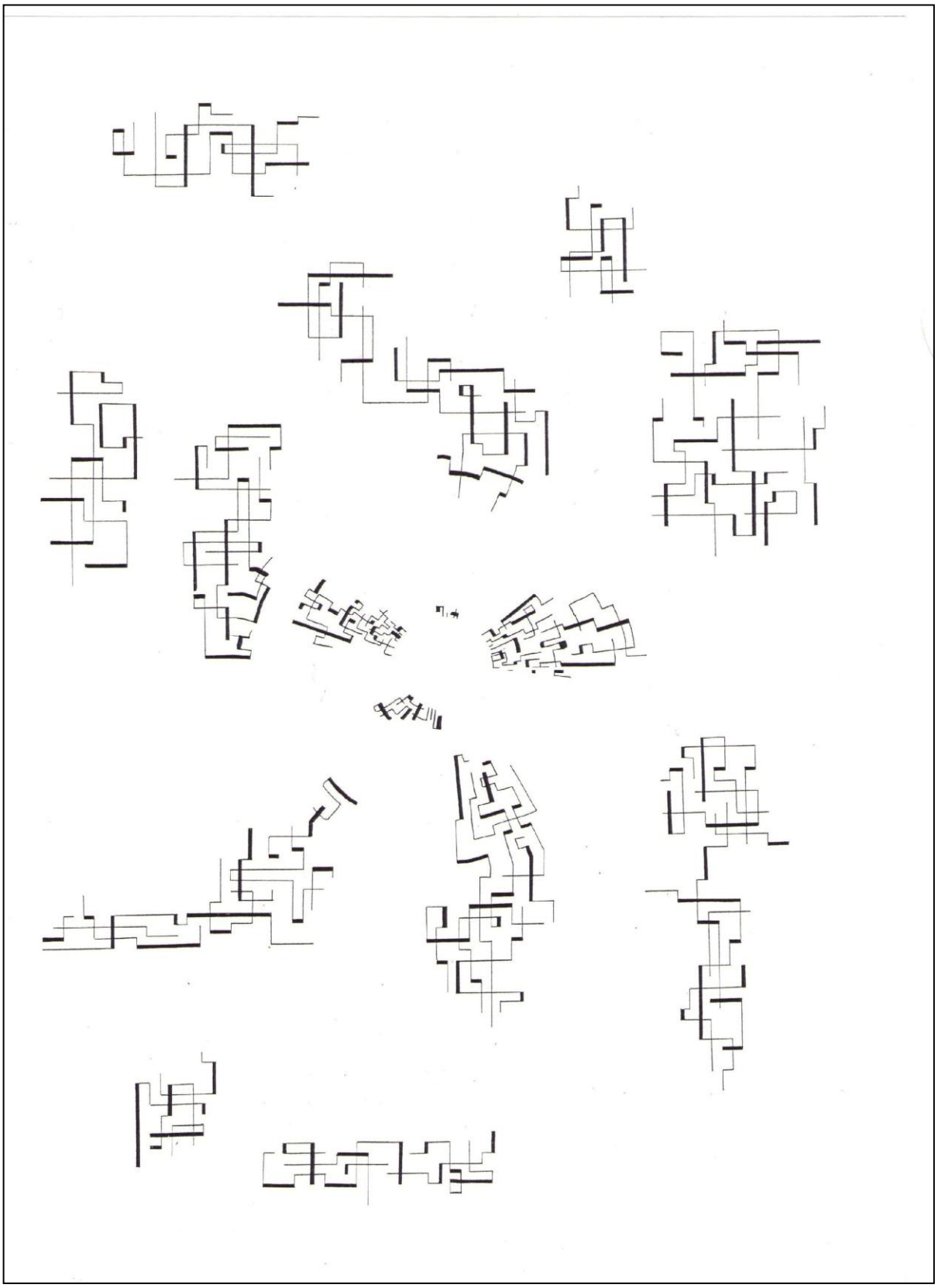


2494.8 cm^2

2494.8 cm^2 *(on previous page) is a graphic score drawn in 2008, on a piece of A2 sized mountboard. Visually, it consists of fifteen blocks, each made up of perpendicular and parallel lines in two thicknesses (although towards the centre of the piece, these lines begin to converge).*

The score is presented alone - it comes with no instruction or guide to instrumentation, nor on approaches to its realisation.

The recordings submitted of this work are realisations by Francesco Serpetti, recorded in August 2009.

Context and Conception

2494.8 cm^2 is the outcome of explorations into creating graphic scores that began in 2007, sparked by my discovering of Earle Brown's famous graphic score, *December 1952*, from his set of pieces *FOLIO*. I first encountered this score printed no larger than 10 cm by 10 cm, printed slightly faintly due to the photocopy it was on, yet the poor quality and size of this reproduction did not restrict the immediate effect that the score had on me.

It was not the lack of conventional notation or instruction that I found alluring about *December 1952* – at that time, graphic notation itself was not alien to me, and I was familiar with graphic notation derived from extending conventional music notation, as well as graphic representation of sound. What resounded so strongly with me was the reductive quality of Brown's score – this composition of perpendicular and parallel 'events' eschewed conventional notation and reduced what I perceived was necessary in a score to almost the bare minimum. The scoring of sound so reductive in visual complexity and instruction aligned with the compositional language I had converged towards with my (then) recent works, which

were quiet, understated and uncomplicated.

The appearance of the score may appear abstract, however Brown intended for these 'events' to be realised with as having proportional relationships with each other – in the prefatory note that accompanies *December 1952*, Brown stipulates that

> In a performance utilizing only three dimensions as active (vertical, horizontal, and time), the thickness of the event indicates the relative intensity and/or (where applicable) instrumental clusters. Where all four dimensions are active the relative thickness and length of events are functions of their conceptual position on a plane perpendicular to the vertical and horizontal plane of the score.[1]

It was viewing *December 1952* as an array of graphically defined parameters (with length of event as duration and thickness as intensity), each that could be measured relative to other parameters, that provided a starting point for my exploration into the graphic arrangement of sonic material – representing musical parameter as shape or graphic.

My initial graphic scores (in 2008) were composed almost entirely with this graphic defining of parameters in mind, although as to what parameters each graphic represented was intentionally never specified. It was a feature of these scores that the interpreter would have to decide which parameter each element of graphic design was to represent – in this way each score could be interpreted in several different 'rotations', producing different sets of performance stimuli even before the attribution of relative scales to each parameter, and allowing the interpreter the option of attributing whatever parameters to a design they felt most compelled to. My intentional omission of parametrical specification can be traced back to

[1] Earle Brown, *'Folio and Four Systems Prefatory Note'*, http://www.ubu.com/sound/brown.html, accessed 25 February 2010

when first encountering *December 1952* and, prior to reading its prefatory note, fleetingly contemplating the score with the parameters unspecified. It was the exploring of this indeterminate quality that most interested me, even though this was a mistaken perception of the score and not a quality inherent in *December 1952*.

The interpreter of a score's attribution of parameter to a set of graphically defined relationships was something I explored in my early graphic scores, and it is a quality that I applied intentionally to *2494.8 cm^2*. Whilst these initial scores contained a number of indeterminate elements (instrumentation, pitch, dynamics, form), overriding these was the indeterminacy of the specification of parameter, and through sketching these scores I was able to shape my attitude to this form of indeterminacy.

When beginning to think of the 'rotations' and possibilities a graphic score with unspecified parameters may present, it is the parameters that are predominantly denoted in conventional notation that spring to mind first (pitch, note/event duration, dynamics/volume), and the different combinations these can be arranged in. In a simple example, an interpreter may choose to attribute pitch to the height of graphic events and duration to the length of these events (or vice-versa for another 'rotation' of attributing parameters) - in the first case parameters are assigned in a manner not too dissimilar to conventional notation (pitch denoted vertically and duration notated horizontally). But in a score where the parameters to be assigned to graphic design are indeterminate, the possibilities for different approaches to realisation are limited only by the interpreter's creativity and imagination.

Indeterminacy in the direction or path a score is read can provide further possible permutations of interpretation (for example being Brown's specification that *December 1952* can be read from any of four directions),[2] and these can be in addition to permutations of interpretation available in a graphic score

[2] Earle Brown, *'Folio and Four Systems Prefatory Note'*, http://www.ubu.com/sound/brown.html, accessed 25 February 2010

through the non-specification of parameters. Depending on the graphic content, an interpretation of a score read left to right could produce an entirely different realisation to an interpretation reading top to bottom, or from the centre of a score outwards.

It was wanting to explore both these indeterminacies simultaneously that led to my designs for a three-dimensional graphic score, that in turn ultimately led towards the composition of *2494.8 cm*^{2}. The designs for this three-dimensional score were of a transparent cube containing sparsely spaced blocks of intertwined 'tapes' (flat lengths of card, with a width of 5 mm, folded at right angles at intervals in 5 mm multiples). The physical transparency of this three-dimensional score would allow it to be read from different angles, thus aligning the blocks in different arrangements when viewed from different perspectives. Unfortunately this three-dimensional score got no further though than initial sketches and machetes, due to the cost and difficulty of creating such a score from my preferred material, resin.

Much of the material from this three-dimensional design though was transferred to the composition *2494.8 cm*^{2}, to the point that *2494.8 cm*^{2} could almost be seen as a two-dimensional take on the cubic graphic score I had planned. There are similarities in terms of graphic organisation: both the three-dimensional design and *2494.8 cm*^{2} allow for parameters to be interpreted at different levels of focus – each score contained blocks that would have a depth, width and height, but the 'tapes' or line that made up these blocks could also be interpreted as parametric values. In addition, the two tones of line thickness in *2494.8 cm*^{2} are drawn directly from the different apparent thicknesses tapes when viewing machetes of the three-dimensional design from different angles.

The perpendicular grid-aligned nature of the scores graphic material is broken down and distorted towards its centre, where the blocks of line begin to converge towards the centre when they reach an outer radius, before disappearing at an inner radius. This graphic gravitation towards the centre of the score is an interpretation of the predicted qualities of the 'event horizon' of a collapsing star in theoretical

physics, where light is bent inwards towards the collapsing star to such an extent that it can no longer escape - in the case of the score, graphic material contorts towards the centre of the score, before disappearing at the inner radius. As this distortion of previously regimented material provides the most contrasting region of the score, it may be expected for this contrast or change to be realised in interpretation. However, as the parameters that the graphic material may represent are unspecified, it is indeterminate as to how the score's central contortion may be realised.

It was after drawing *2494.8 cm*^{2} that I was to create instructions for its interpretation (much in the same way as I would define any ambiguous or unconventional notation in a conventionally notated as a last step). As mentioned earlier, the score was conceived as one that presents the interpreter with multiple graphics that could be interpreted by attributing parameter. However, with the finished score in front of me I decided it would be best to omit instruction on its interpretation – my imagination was already starting to imagine other (non-parameter based) approaches to its realisation, and it was my view that providing instruction on approach could only limit the possibilities available to an interpreter of the score.

The indeterminacy of specification and instruction in *2494.8 cm*^{2} is not dissimilar to that in Cornelius Cardew's *Treatise*. The 193 pages of *Treatise* come without introduction or instruction on how to approach the score, and the geometric shapes and lines that form large parts of the score are abstract from conventional music instruction.

In *Treatise Handbook* (a collection of notes on, analyses of, and more conventional notations of *Treatise* published four years after the original score), Cardew touches on why he omitted instruction from *Treatise*. Although he says that 'the temptations to explain the unexplained and offer instructions on how to cope with the lack of instructions hold no attraction'[3] to him, he does state that instruction is omitted

[3] Cornelius Cardew, *Treatise Handbook* (London: Edition Peters, 1971), i

from *Treatise* to in some way liberate the interpreter, so as not to 'mislead prospective performers into the slavish practice of "doing what they are told"'.[4]

It is the liberation of the interpreter that led me to omit instruction in *2494.8 cm²*, yet I would not argue that it is to liberate the interpreter from conventional practice and instruction as Cardew does. Depending on the composition, written instruction, however detailed, may provide an interpreter with direction and impetus for their realisation. Rather than a desire to minimise any limitations imposed through instruction, my decision to omit instruction was to grant the approaching of the score to the interpreter, enabling them to create their best interpretation of the graphic material they are presented with.

The composer's control is sacrificed in order to grant the interpreter the freedom to create their best realisation of the graphic score, based on their impression – they are limited in this way only by graphic material, which itself is the content of the score.

Approaches to Realisation

Whilst I have so far discussed the permutations of interpretation presented by *2494.8 cm²'s* unspecified parameters, the definition of these is not the only way the score could be approached. The original conception and design of *2494.8 cm²* were undoubtedly based on parametrical representation – however, it was when thinking about the permutations of directional approach for the score that I decided not to include instruction with the score, and thus leave the work open to non-parametrical interpretation. The possibilities I imagined quickly moved from readings perpendicular to the edges of the score, to a simultaneous edges to centre reading, to then considering less logical paths where all sonic events were to be affected by the gravitational element of the score. Because these considerations (just concerning

[4] Cardew, *Treatise Handbook,* i

the form of an interpretation) so rapidly moved from conventional readings of the score to more lateral approaches to the graphic material, I felt inclined to leave the score completely open to interpretation in how to approach it.

But while the score could provoke any number of realisations (many even unimaginable to the composer), the nature of the material I have set out and approaches to preceding graphic scores that bear similarities to *2494.8 cm*^{2} mean I am able to discuss ways I might expect *2494.8 cm*^{2} to be interpreted.

That a graphic score without conventional notation or instruction as to its approach may deter or stifle a performance is a possibility, yet the majority of potential performers of graphic scores would be familiar with the freedom of approach often presented by graphic scores. Degrees of freedom in the direction a graphic score can be read are common for graphic scores that do not organise their material in a linear fashion – *December 1952* can be performed in 'any direction from any point in the defined space'[5], and Brian Schorn's *Nebula* instructs performers to 'select a path to take from the shared central core to an outer individual core'[6] (each core being a distinctive region against the white background of the score). The staves drawn throughout Cardew's *Treatise* as well as the page numbering strongly suggest *Treatise* should be read left to right sequentially – but with no instruction as to how to approach the score, performers could chose to skit at will through different sections of the score, arguing that they do interpret the page numbers sequentially, but almost as reference numbers for each section of the score, unrelated to any order.

Approach by no means has to be a sequential translation of graphic events into a chronological order of sonic events (whether the path traced across a score is linear or more haphazard). Interpretation of the

[5] Earle Brown, *'Folio and Four Systems Prefatory Note'*, http://www.ubu.com/sound/brown.html, accessed 25 February 2010

[6] Theresa Sauer, *Notations 21* (New York: Mark Batty Publisher, 2009), 219

whole of a graphic score unaccompanied by instruction can also be achieved by ignoring any parameters or sequential order that may be alluded to, and the interpreter using their overall impression of the score and personal notion of how this could be realised to create a sonic product (using this approach may in fact be a necessity when it is felt by the interpreter that no parameters are alluded to). This approach could be regarded as a 'graphic synaesthesia', where the interpreter draws on their personal synaesthetic perceptions of a graphic or image to create a sonic representation of the score.

Whether the interpreter is to navigate their own path across *2494.8 cm²* or do so through a 'graphic synaesthesia', the issue of co-creatorship is prevalent due to the lack of explicit instruction on the score as to sound content – the instrumentation, pitch, duration or timbre of sounds.

A composer can leave any element of a composition open to varying degrees of indeterminacy in its performance. For example, indeterminacy in the element of pitch could range from the performer selecting pitch from a given set of pitches (Reginald Smith Brindle's *Three Dimensions* is a good example[7]) to exact pitch being undefined, to be performed with indication only given to relative pitch (for example, Bruce L. Friedman's *O.P.T.I.O.N.S.*[8]). The finer detailed indeterminate elements (such as individual note durations or exact pitch) have a less significant impact on the realisation of a piece when encompassing elements such as approach to the score and sound content are undefined and indeterminate – choices around approach and the sound content will define a realisation ahead of these finer details. Such a score as *2494.8 cm²* leaves encompassing elements such as approach and sound content indeterminate, and so it will be the definition of these by the interpreter that go the furthest to defining their realisation.

[7] Reginald Smith Brindle, *The New Music: The Avant-Garde since 1945* (2nd edn., Oxford: Oxford University Press, 1987) 85

[8] Theresa Sauer, *Notations 21* (New York: Mark Batty Publisher, 2009) 79-80

The resulting realisation is a co-creation (between the composer and interpreter) of the composer's ideas rather than a re-creation of them, as Clemens Gresser describes:

> With compositions that are indeterminate with regard to their performance, one is required to address the flexibilities of the score or even its lack of information. In other words: does one deal with this challenge creatively, or imitate the solutions of someone else in order to deal with the specific tasks of a composition? Overall, it is more important to look at the actual possibilities for such creativity than to examine whether or how performers have previously appreciated or made use of such co-creatorship.[9]

I share the view that it is imagination and creativity in approach by the interpreter that will produce the most interesting realisations to such a graphic score as *2494.8 cm*^{2}. The lack of instruction around sound content though does shift the emphasis its creation towards the interpreter. My contribution to sound content as composer here only goes so far as to provide the stimulus for an interpreter – timbre, dynamics, pitches and differentiation across all these parameters must be decided by the interpreter. The decisions an interpreter will make about the sound content of their interpretation will depend on how they approach the score – if they are to employ a 'graphic synaesthesia', it is their personal impression of the graphic material that will determine the sound content; if they decide to attribute any number of parameters to the dimensions of the graphic detail, then this more detailed content can be used in their interpretation.

[9] Clemens Gresser, 'Earle Brown's 'Creative Ambiguity and Ideas of Co-creatorship in Selected Works', *Contemporary Music Review Vol. 26* (2007), 378

Realisations of *2494.8 cm²* by Francesco Serpetti

The recorded component of this Masters thesis contains four realisations of *2494.8 cm²*, each performed by the improviser Francesco Serpetti on piano and electronics. These were recorded as a case study on the realisation of such a graphic score so void of instruction, and to explore the differences in approach between unobserved realisations (realisations where the composer is not present) of graphic scores and observed realisations (with the composer 'overseeing' a realisations, being able to suggest approaches and possibly further elaborate on graphic ideas). Although this study only covers one score (*2494.8 cm²*), it is important to explore the differences between observed and unobserved realisations, as typically a composer of a graphic score will create the work to be realised unobserved, at which point there is no chance to further clarify a graphic idea or possible intention.

The first three recordings (Versions 1-3) are unobserved by myself, the composer, and are Francesco's own interpretations on the graphic score; the last (Version 4) was observed by myself, after a discussion between myself and Francesco on the ideas behind the score and possible approaches that could be drawn out. The discussion on approaches and observed realisation took place after we had recorded Francesco's unobserved versions, in order to restrict the performance stimulus for his improvisation to that of just the score, and not of any further concepts or ideas. This order of this approach to recording ensured a separation between the unobserved and observed versions. After all recordings were made, I discussed with Francesco his approaches to his unobserved realisations, which provide valuable examples of one performer's interpretation of the score.

I have earlier described two general approaches an interpreter could take when realising *2494.8 cm²*: tracing a path across the score (either linear or more haphazard) whilst attributing parameters to graphic elements, or by realizing sonic impression from the visual impression given by the score (this does not however have to be a literal translation from visual to sonic – a personal synaesthetic perception of the

score could be used to make a translation). The parametric design of *2494.8 cm^2* means relative values can be drawn from the perpendicular lines (although, as mentioned earlier, what parameter these represent is indeterminate). Yet the inclination of the performer, with such an abstract score in front of them, may equally be as to treat the score as a single entity, as a stimulus for, as Smith Brindle describes, 'musical creativity through graphic design'[10], or through 'graphic synaesthesia' as described above.

Combinations of these approaches were used by Francesco in his unobserved realisations of the score. In Versions 2 and 3 each block on the score is interpreted as a sequential event, and the score is read through the events in a spiralling fashion. In this version graphic events are translated into sonic events, and not read as a sonic instruction. Likewise, Francesco read the score as a spiral of events in Version 1, though this time he traced shapes from the score onto the touch screen interface of his Korg Kaoss Pad, using the graphic design of the score as instruction for the production of sound.

With regards to the form of each realisation, Francesco's unobserved versions all interpreted the score as a sequential spiral of events. In the observed Version 4, after a discussion on other possible approaches to the score, the score is read from the edges to the centre. This is one way the graphic gravitational element of the score could be applied to the realisation (there is a visible outer radius on the score at which point events begin to contort towards the centre of the score, which may suggest a gravitational pull, and an inner radius at which events appear to disappear). Whilst reading the score, the gravitational effect was realised through sonic events being pulled further apart temporally when this first horizon was met, to a point where no further events occurred when the inner horizon was met. To record this gravitational approach to form was something of a luxury (afforded by the composer observation of the realisation), yet this somewhat particular approach to form was recorded to provide a version where my original intention of this graphic had been discussed. This original intention was not of sonic result

[10] Smith Brindle, *The New Music: The Avant-Garde since 1945,* 87

however – the graphic gravitational element does not need to be realised as form (as in Version 4), and can, if the interpreter is stimulated by it, be realised across any musical parameter.

That strict control was applied in terms of communication to ensure Francesco received no other performance stimulus from me other than the score prior to his unobserved versions means that the recordings Version 1-3 made of *2494.8 cm*^{2} should be considered as fair realisations of the score alone. However, clarification must be made on further factors (beyond the creation of the score) that I had influence on. Firstly, I approached Francesco to realise the score, so this selection by myself had a direct bearing on this particular realisation (as I knew previously of Francesco's improvisation ability and style). Secondly, although instrumentation is indeterminate in the score, by inviting Francesco to record these versions it became determined by myself: I booked out the piano in the Barber Institute's concert hall and arranged amplification for Francesco's electronics. Thirdly, Francesco is familiar with my compositional style, and could have conceivably tailored his improvisation to what he felt would sit with my tastes.

The only way to negate these points would be to possibly make a distinction between my role as composer (up to the point of completing the score) and my role in the production of these recordings (from the point of contacting Francesco with regards to these recordings). However, such a distinction would become incredibly hard to define when it is the influence of a composer through observation of realisation that is being investigated, and considering myself to be constantly 'switching roles' would blur the distinction between the observed and unobserved versions.

Despite the reservations I set out above, conducting the case study in the manner I did enabled me to draw valuable insights into how the score might be perceived and interpreted. Communicating to an interpreter/performer through graphic language is a less tangible communication than through written language or conventional musical notation due to the lack of shared rules and conventions. It was of great encouragement Francesco managed to draw parametrical stimulus from the score in his unobserved

versions, indicating that this can be drawn from the score (although not all interpreters may do so/choose to do so), whilst also drawing an impression from the whole score to produce the form of his interpretation.

Version 4 to me provided the most interesting result, for its heightened co-creatorship. I now realise that in addition to creating the graphic material for this version, it is also my synasethetic perception of my own work (that of events being affected by the gravitational design of the score) that I asked Francesco to consider whilst improvising. Whilst the approach to form is indeterminate in the score, it in a sense was rendered determined after I had discussed my ideas of this graphic design to Francesco (although form itself was still indeterminate due to realisation being improvised). I would wish that Version 4 should be considered to be only one possible interpretation of *2494.8 cm^2*, yet by the application of my own synaesthetic perception of the score to its realisation, it may unfortunately be viewed with heightened authority, as though further composer 'intentions' have been applied to the score.

This however must be a risk with all indeterminate scores if the composer him/herself is involved in one of their interpretations – it becomes difficult to separate their contribution from that of composer to that of producer of a realisation or observer – and at the point of an awareness of a composer's 'version' to any interpreters, it is possible the possibilities presented by the indeterminacy of a score are reduced by the further intentions or suggestions made by the composer.

STJEPAN + NATALIA

Every day, thousands of young eyes meet over station platforms, across shop counters, across the din of crowded bars or cafés, in the silence of libraries, or as passers-by pass each other by. It is the shared glance between two strangers, a moment when each looks up or away from their preoccupation and towards the other; a brief synchronisation between two lives that are otherwise exclusive of each other.

On the surface, all of these glances are meaningless and disposable - there has been no previous communication between the strangers for the look to mean anything, and their lives may continue completely undisrupted, the glance treated as coincidence, as a mistake, one stranger posing no interest to the other.

The quantity and saturation of these moments mean that on occasions though a caught glance will be less fleeting; one will feel some attraction to the other, a particular attraction that separates this stranger from all others around them. The moment of this shared glance becomes laced with curiosity and yet caution, as a shared glance alone means nothing; a brief synchronisation of two live that are otherwise exclusive of each other.

Further glances are shared, missed, caught or lost; eyes dart from the corners of rooms and carriages to the tops of magazines and the bottom of table legs; their curiosity looking cautiously around for another moment of brief synchronisation.

The passage of text above that appears in *Stjepan + Natalia*'s production notes was the conceptual basis that always underpinned the composition of the piece, before a single note had been selected or sounded. It is not only the musical material of *Stjepan + Natalia* that takes concerns itself with the synchronisation between strangers - the realization of the work should be considered as an understated piece of theatre,

with the two characters (pianists Stjepan and Natalia) hinting ambiguously to the audience at the possibility of such an attraction (as described above) between them, and staged such that one's glances over the top of their piano will miss the other's, until a predetermined synchronisation between the direction the characters face occurs (based on the register of the piano where their notes fall). To achieve this, the score is actually written for a producer of the work, whose task is to create this ambiguity before the audience through casting Stjepan and Natalia, and creating the intimacy and environment on stage for these glances to be accentuated yet not overstated.

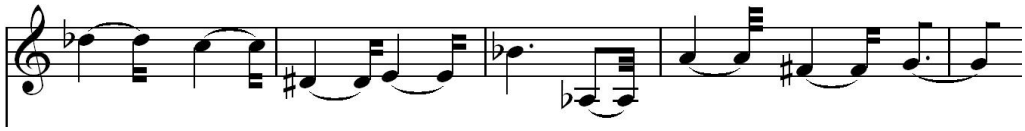
Given the subtlety, naivety and elusiveness involved in the subject matter then, it may seem odd, that in areas, my compositional approach to this piano duet verged on rigidity and calculation of total serialism - every note duration and pitch-class (each class of all pitches that are exactly octaves apart)[11] is derived from two nine-note rows - Natalia's opening line and Stjepan's opening line. Serialisation of compositional material would certainly not appear to be the most obvious way to portray a moment of potential attraction between two strangers – one might consider it a subject that should be explored emotively by the composer, rather than through serialisation of material. It was not however this potential attraction between the two characters that I wanted to set up in the sonic composition of the work – musically, I chose to reduce this meeting of glances to a moment of mere synchronisation, when the rhythms of in the piano parts of Stjepan and Natalia finally briefly align.

Serialisation of Material

A (now) preliminary version of *Stjepan + Natalia* was drawn up as part of a compositional assignment a couple of years before the submission of the final version; this version was to build towards the same type of synchronisation of rhythms and glances that the presented final version does, and employed the

[11] John Rahn, *Basic Atonal Theory* (New York: Schirmer Books, 1980) 22

serialisation of pitch-class and duration. Its structuring of material was far less advanced than in the presented final version however, yet the mathematical methods of preliminary working utilised prevailed, and my compositional approach between now and then was largely maintained. Pivotal to the generation and organisation of material was an initial translation of pitch-classes into numbers, and working with these within a cyclic abelian group of order 12 under the operation of addition. Nearly all calculation and compositional design was carried out working within such a group, before finally translating the results back to pitch-classes as well as durations.



Above: Natalia's opening line

Above: Stjepan's opening line

Above are each of Natalia and Stjepan's opening lines: Natalia's was composed freely (with the only limitation of avoiding repetition of pitch-class, as in twelve-tone technique, although there was no prerequisite that the line should have been twelve notes long); Stjepan's was derived from inverting Natalia's pitch-classes around her opening pitch-class, before transposing by seven semitones upwards.

Each was then expressed numerically, given a value between 0 and 11 (with C natural denoted as 0 sequentially up to B natural as 11). For ease of notation, (so as not to get 10 confused with a 1 and 0 for example) the characters ↊ and ↋ were used to denote 10 and 11 respectively. (Many atonal composers and analysts use characters "A" and "B" or "t" and "e" respectively to denote 10 and 11 – I prefer the

numerical appearance of the ↊ and ↋ symbols, taken from the Pitman Dozen Scale).[12] Natalia and Stjepan's opening lines could now be expressed as

N = <1034↊8967>

S = <8965↋1032>

with **N** and **S** used to denote Natalia and Stjepan's line respectively, and < > used to denote an ordered set, as used by Rahn.[13]

Once represented numerically, each line could be manipulated far more easily. These two lines and their assigned numerical values were to be used to generate almost every element of the piece – all pitch-classes and durations are derived, by some process, from these original lines. The most important manipulation of these lines was done to create sequences of note durations for each pianist that would at some point align, producing the synchronisation between parts that I wished to create. Durational values were kept in base 12 (with 1 to ↋ representing the equivilant number of demisemiquaver units in length, and 0 representing a length of 12 demisemiquavers), ensuring compatibility between calculations carried out on pitch-classes, and vice-versa.

I wanted there to be an effective 'arrival' at this synchronisation – a point where the each set of durations would converge from separate paths. Although there were many ways to approach this, I wanted this synchronisation to be between something that would be inherent in and unique to each line – and this led me to utilise the square roots of each line.

[12] *The Dozenal Journal*, http://www.dozenalsociety.org.uk/pdfs/DozenalJournal.pdf, accessed 8 January 2010

[13] Rahn, *Basic Atonal Theory*, 21

Each line was totalled (this meant temporarily leaving the ableian group of order 12) and the results (a total of 48 for Natalia's line and 45 for Stjepan's) were square-rooted using the mathematics software Maple, but in base 12 rather than base 10. Each square-rooting produced an irrational number, with an infinite non-recurring set of digits behind the dozenal point (the equivalent of a decimal point in base 12). This non-recurring sequence of digits would primarily dictate note durations: the opening 350 dozenal places of Natalia's sequence (√48 in base 12) are shown below:

6.Ɛ17Ɛ27ƐƐ22Ƶ41745933368Ɛ987ƐƵ3306Ƶ02364101ƐƵ5Ɛ50Ɛ0Ƶ6Ɛ05ƐƵ301Ƶ58Ɛ56Ɛ9
62402088ƵƵ2Ƶ5965451383665660 3Ƶ7ƵƐƐƐ3853Ɛ99462730 8Ɛ6ƵƐ8228Ƶ668487 42Ɛ
64721Ƶ5504Ɛ7Ɛ1840Ƶ8ƐƐ54Ɛ77729649396Ƶ9470Ɛ4Ɛ84688404ƐƵƐ78ƵƵƐƐ366Ɛ53
8754357292Ƶ2Ƶ8399689504182Ɛ380756392618631511883 9ƵƐ594963628471596
ƐƐ488024Ƶ0118Ɛ4ƐƵƐ17694576Ɛ505944155983287989404086 51Ƶ252Ƶ57832Ɛ62Ƶ
7873ƵƵƐ48394234Ɛ

I used Maple to calculate the first 150,000 dozenal places for each square root – the highest number of digits the computer I was using could calculate, and far in excess of what I needed for durations in the work. This was done as I wanted to find the longest common substring possible of digits between each sequence (a longer substring would give more distinction to the synchronisation), and as the length of digits calculated increased, the so did the longest common substring.

Maple was again used to find the longest common substrings of digits in from each vast sequence of digits – analysing the first 150,000 digits of each result produced a common substring of ten digits, and Natalia and Stjepan's sequences where aligned to each other at the substring. The durational material for the rest of the work was selected from the sequences of digits immediately before and after the common substring in each part. The string of ten synchronised durations can be found in bars 84-86 of the piece,

standing out in a work where durations very rarely synchronise.

The summations of Natalia and Stjepan's lines were also to define the length of the work in durational units (a unit being a demisemiquaver) by multiplying the summations together ($\sum \mathbf{N} \times \sum \mathbf{S} = 48 \times 45 = 2160$ units). I had an rough idea of when I wanted the synchronisation to occur (about four fifths or so through the piece) – the exact point within the 2160 demisemiquaver units for the moment of synchronisation was defined by dividing the inverse of the cube-root of the summation of Natalia's line by that of Stjepan's ($\sqrt[3]{(1 / \sum \mathbf{N})} \div \sqrt[3]{(1 / \sum \mathbf{S})}$) to give, in terms of the proportion of the whole, the point of synchronisation. Hence, with only a touch of composer's intuition (where the synchronisation should occur), all durational elements – the length of notes and chords, and the length of the piece in units – are derived from relationships inherent in the numerical translation of Natalia and Stjepan's opening line. Even the first note durations of the piece – the opening four notes of Natalia's part are all ten demisemiquavers in length – are determined by these proportions, all derived from both Stjepan and Natalia's individual lines.

The sequence of digits determining note duration remain 'underneath' the piece the whole way through, although the option to choose no note or chord for a give value in the sequence was often taken up. Even when one of the piano parts drops away for an extended period, this is still in line with the sequence of values lying beneath. The compatibility of the base 12 durational and pitch-class systems allowed the underlying set of durational values are used as a secondary pitch-class material, normally adding values from the irrational durational sequence to pitch-class values from the Natalia and Stjepan's original note rows, or retrogrades or inversions of these note rows.

The manipulations of note rows and duration data come in a variety of complexities: examples range from a pure retrograde of Natalia's original note row (where pitch-classed are un-manipulated by duration value material) in Stjepan's part in bars 43-46; the adding of durational values to pitch-classes in Natalia's

note row to produce Natalia's second entry (bars 8-9); to bars 12-13, where Stjepan's original note row is added to notes from Natalia's preceding chord, which in turn was made up by combining Natalia's original note row with substrings of durational values.

The interference of the durational values in the operations and manipulations of pitch-classes means at points the piece can move away from the tonal neutrality of most serial music, and at points begin to focus around certain pitches of set of pitches. These points of focus are entirely by chance – due to there being repetition in the irrational string of digits produced by square rooting, or due to these digits adding up with Stjepan or Natalia's note rows to produce repeated pitch-classes. I have chosen, in certain instances, to accentuate these occurrences further by doubling octaves between parts, or have the same pitch played sequentially, to emphasis the repletion of that pitch-class.

Combining substrings of durational values with consecutive pitch-classes of one of the pianist's note rows was often used to create multiple pitch-classes, providing material for chords. I nearly always chose to produce nine values for each chord (in keeping with the nine-note rows used) – however, duplicate pitch-classes would be reduced to a single pitch-class, meaning many chords have less than nine notes, and chords in each part would never contain two of the same pitch-class. All twelve pitch classes are used in one chord in Natalia's part in bar 49, through a process of accumulating pitch-classes.

Whilst the pitch material for *Stjepan + Natalia* was generated in a serialised way, there was freedom in the voicing of pitch-classes and, and combined with the soft dynamics and depressed sustain pedals throughout, the voicing of these chords creates a quiet, static and intimate language.

It is the at the point of setting the pitch-classes to actual pitches that my own compositional language at last comes through in the compositional process – although decisions were made before this stage (for instance, when applying retrogrades and inversions to lines and determining the length of chord

progressions) all pitch-class material was presented to me predetermined, forcing me to voice chords with the material I had been given.

The use of externally generated material is something often associated with techniques used to create works that are indeterminate in their composition – most famous is John Cage's use of *I Ching*. The composition of *Stjepan + Natalia* presented me with similar problems to such techniques – mainly the appearance of pitch-classes or durations that at times don't appear to fit with the composers natural inclination of where the work may be heading. Such generative techniques however are used to avoid the use of such inclination, and generate material that could not be foreseen by the composer. This is certainly the case – the large strings of digits obtained from square-rooting the summations of each line (in base 12) meant I was unable to predict what pitch-classes or durations I would be dealt. However, although these results may have seemed indeterminate to me whilst composing, they should be not be confused with indeterminate technique in composition: the compositional process was not subject to chance, and the conducting the composition again with an identical approach would produce the same set of pitch-classes and durations, whilst indeterminate compositional techniques would be expected to produce different pitch-classes and durations when repeated. *Stjepan + Natalia* is then predetermined in many aspects of its composition – a contrast to *2494.8 cm^2*, where so much of the composition is indeterminate.

Performance of *Stjepan + Natalia*

The appointment of a producer in *Stjepan + Natalia* may provoke surprise due to the understatement of the stipulated theatre element. It is not so much that I wished for the performance to be worked theatrically, but rather I wanted to stimulate the kind of attention to detail in staging and environment that would be inherent in most music theatre. The theatrical element of *Stjepan + Natalia* would hardly align with the experimentalist tradition of American Music Theatre - the subtlety of the proposed staging

should hardly distract from the sonic content of the work. Far from creating a parallel visual stimulus, through physical actions or some of the buffoonery Smith Brindle describes[14], the theatrical production of *Stjepan + Natalia* should only accentuate the sonic material, and give personification to the two piano lines and the delicate relationship between them.

Although it is not communicated in the score, I would hold no objection to one of the performers doubling up as the producer of the work. It is by scoring the producer into the work that I feel places an emphasis on the theatrical staging element in the preparation of a performance, and indeed places an explicit responsibility on someone to implement the production notes.

I do not feel that the vagueness and ambiguity between the characters could be created without such attention to the production of this performance. Indeed, the communication of such an understated set of events may be the hardest feat to achieve in its performance (above even the challenging metric and syncopated nature of the piano parts).

There is a duality and incoherence between the compositional technique employed in *Stjepan + Natalia* and the performance directions instructed. The former is mathematical, fixed and logical – it concerns itself with what can be easily expressed and defined. The latter tries to grasp something far more elusive, and simultaneously suggest and confuse. What links the two however is the attempt to express a moment of synchronisation, and each form part of the representation of caught glances – the musical material and compositional design express it as mere synchronisation; a successful production of this material will express anything that is more than this.

[14] Smith Brindle, *The New Music: The Avant-Garde since 1945,* 148

SATELLITES

Of the three works that this portfolio is made up of, *Satellites* depends the least on any forms of indeterminacy or predeterminacy. The indeterminate elements of *2494.8 cm²* mean that composer control is forgone even before the point of performance, and the predetermined values utilised in the calculation of material in *Stjepan + Natalia* only allowed a true musical personality to be impressed on the music in the later stages of its composition. There is a continuous composer control throughout the compositional process of *Satellites* that far exceeds both aforementioned compositions, granted through the control available through studio composition.

I did not consciously consider *Satellites'* relationship to other works of contemporary music at the point of its creation, nor does it strongly correlate to any strands of acousmatic music that were being created by fellow students in the studios at the University of Birmingham at the time. The contemplative ambience and approach to the work was certainly influenced by certain pieces of tape music I had heard - most notably Michael Nyman's *1 - 100*, although in compositional process and final sonic result, *Satellites* bears little resemblance to Nyman's work.

The shape and structure of the music could draw comparisons though with some of György Ligeti's instrumental music. Passages in Ligeti's *Volumina*, a graphic score for organ, are allowed to evolve and reverberate, a quality also inherent in the passages of time-stretched piano tone and radio static in *Satellites*. Finer details in these elongated 'blocks' of sound become of interest, before one timbre is overtaken by another. *Volumina*, a far longer work than *Satellites*, does employ flourishes of increased activity amongst its sustained clusters – something that *Satellites* rarely does.

There is a use of 'soft' indeterminacy in the composition of *Satellites* through the accentuation of minor artefacts in the recordings of sounds. These artefacts – for instance, the stopping of a tape recorder –

were unplanned at the stage of recording, yet they are accepted into the work and given an increased prominence. This acceptance of indeterminate elements though differs from the indeterminacy and predeterminacy inherent in *2494.8 cm²* and *Stjepan + Natalia* – in the latter mentioned works, indeterminacy and predeterminacy are pivotal to the composition of the pieces, and would be entirely different works if indeterminacy and predeterminacy were not accepted: Satellites makes use of accidents in recorded sounds, and any indeterminacy is quickly absorbed and reduced in significance within the work.

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Score for PRODUCER and TWO PIANISTS

stjepan + natalia

by simon kinch

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On the surface, all of these glances are meaningless and disposable - there has been no previous communication between the strangers for the look to mean anything, and their lives may continue completely undisrupted, the glance treated as coincidence, as a mistake, one stranger posing no interest to the other.

The quantity and saturation of these moments mean that on occasions a caught glance will be less fleeting; one will feel some attraction to the other, a particular attraction that separates this stranger from all others around them. The moment of this shared glance becomes laced with curiosity and yet caution, as a shared glance alone means nothing; a brief synchronisation of two lives that are otherwise exclusive of each other.

Further glances are shared, missed, caught or lost; eyes dart from the corners of rooms and carriages to the tops of magazines and the bottom of table legs; curiously looking cautiously around for another moment of brief synchronisation.

PRODUCTION NOTES

It is the brief moment of synchronisation between the strangers Stjepan and Natalia that this performance should be built around. Uncaught glances towards each other finally align as their piano parts do, but if there is any attraction between the characters, mutual or unreciprocated, within that moment of synchronisation it must not be overstated.

It is the producer who must create this moment . They can cast Stjepan and Natalia according to their own ideals, but must also consider the plausibility of a potential attraction between these strangers to the audience, for as much as possible must be in place for this attraction to be believed, even if it is not overstated.

Align the pianos as in either *figure 1* or *figure 2* for the performance – each character's line of sight above their top register should encompass the others.

Let little distract from the missed glances between Stjepan and Natalia through out – there should be an isolation and intimacy in the staging of this performance.

Stjepan and Natalia's glances will finally meet in bars 84-86 as both play in the top register – the meeting of eyes should be still and sustained, and tell nothing to the audience. If this is a moment of attraction between two strangers it should not show explicitly – there should be little between this shared moment a mere moment of synchronisation.

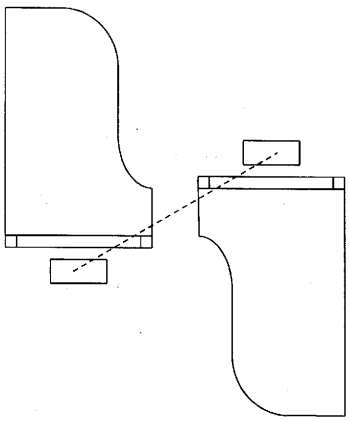


figure 1 – Grand Pianos

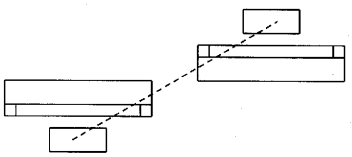


figure 2 – Upright Pianos

PERFORMANCE

Dynamics

Both Stjepan and Natalia's parts are to be played pianississimo (**ppp**) throughout, to create lines of very softly articulated notes and chords. Each player does have the discretion to increase their dynamic slightly to pianissimo (**pp**) if they are playing a line of single notes against chords in the other's part, in order to slightly accentuate their line above the other player's chords.

Pedals

Both Stjepan and Natalia's sustain pedals should be depressed throughout, allowing passages to very softly continue to ring after they end. Each player may on occasions at their discretion release and repress the pedal, but only when they feel it is absolutely necessary due to so in order to release a build up of dissonance that feels out of character with the rest of the piece.

Glances

The work is composed so that neither player occupies the highest register of the piano at the same time until the moment where the parts synchronise (bar 84), allowing each to glance cautiously over the top of the piano at the other. Stjepan and Natalia's glances will finally meet in bars 84-86 as both play in the top register – the meeting of eyes should be still and sustained, and tell nothing to the audience. If this is a moment of attraction between two strangers it should not show explicitly – there should be little between this shared moment a mere moment of synchronisation.

NOTATION

Accidentals

Accidentals apply only to the note they immediately proceed – if no accidental proceeds a note, it must be assumed to be natural.

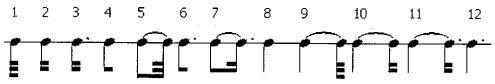
Natural signs are only used where both the sharp/flat and the natural of a note are to be played simultaneously.

Time Signature

Conventional time signature is replaced by square-bracketed numbers above the start of each bar, denoting the number total demisemiquavers in each bar.

The beam groupings of chords or notes of any given length are notated consistently as below throughout the piece to make the recognition of each duration easier.

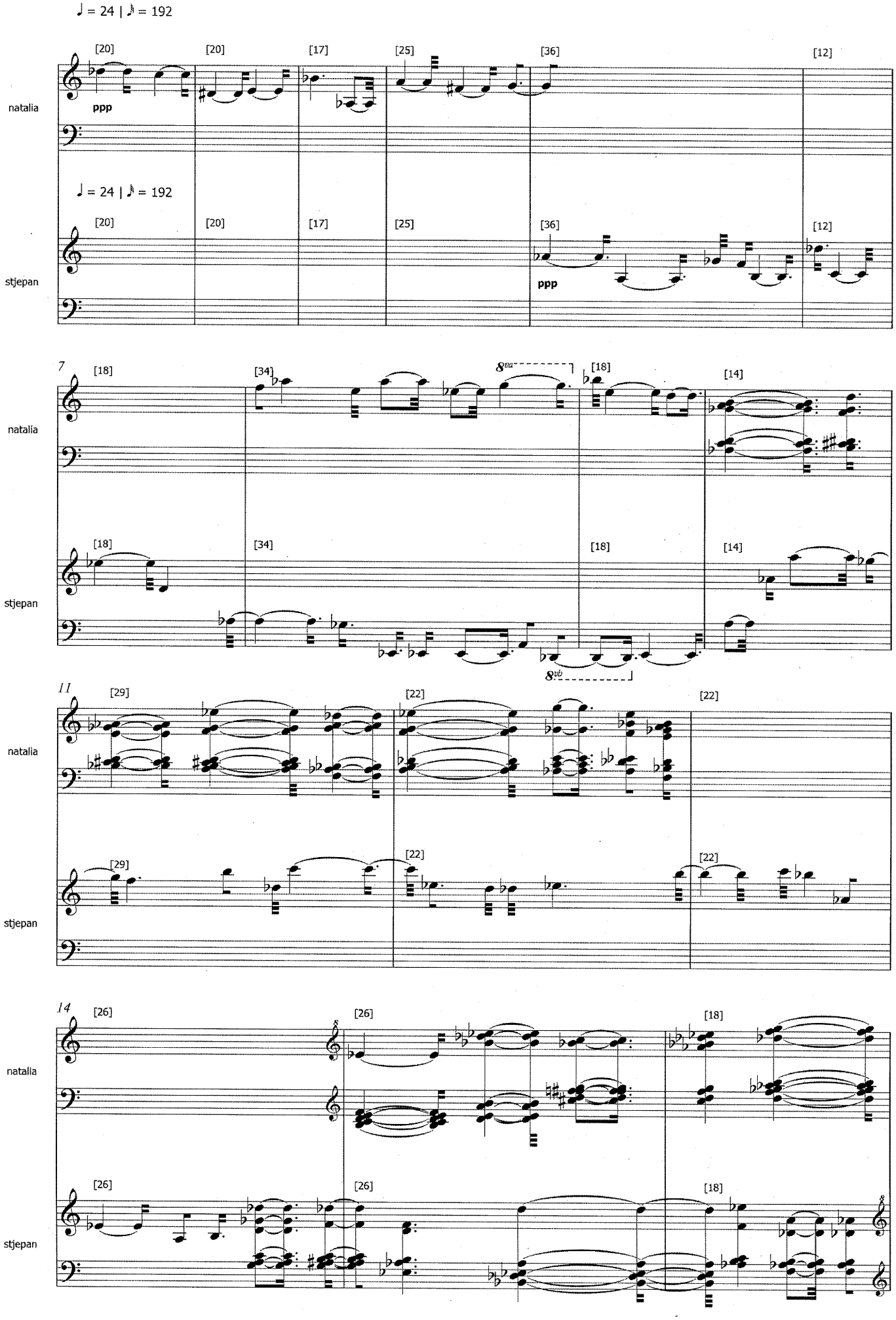
Duration in demisemiquavers:



Rests

Rests are omitted from the score in favour of white-space – empty bars denote bars of rest, and bars where the total duration of notes is less than the denoted time signature are considered to end with rests.

No notes within either Stjepan or Natalia's individual parts overlap, so each full note length must be realised before moving on directly to the next.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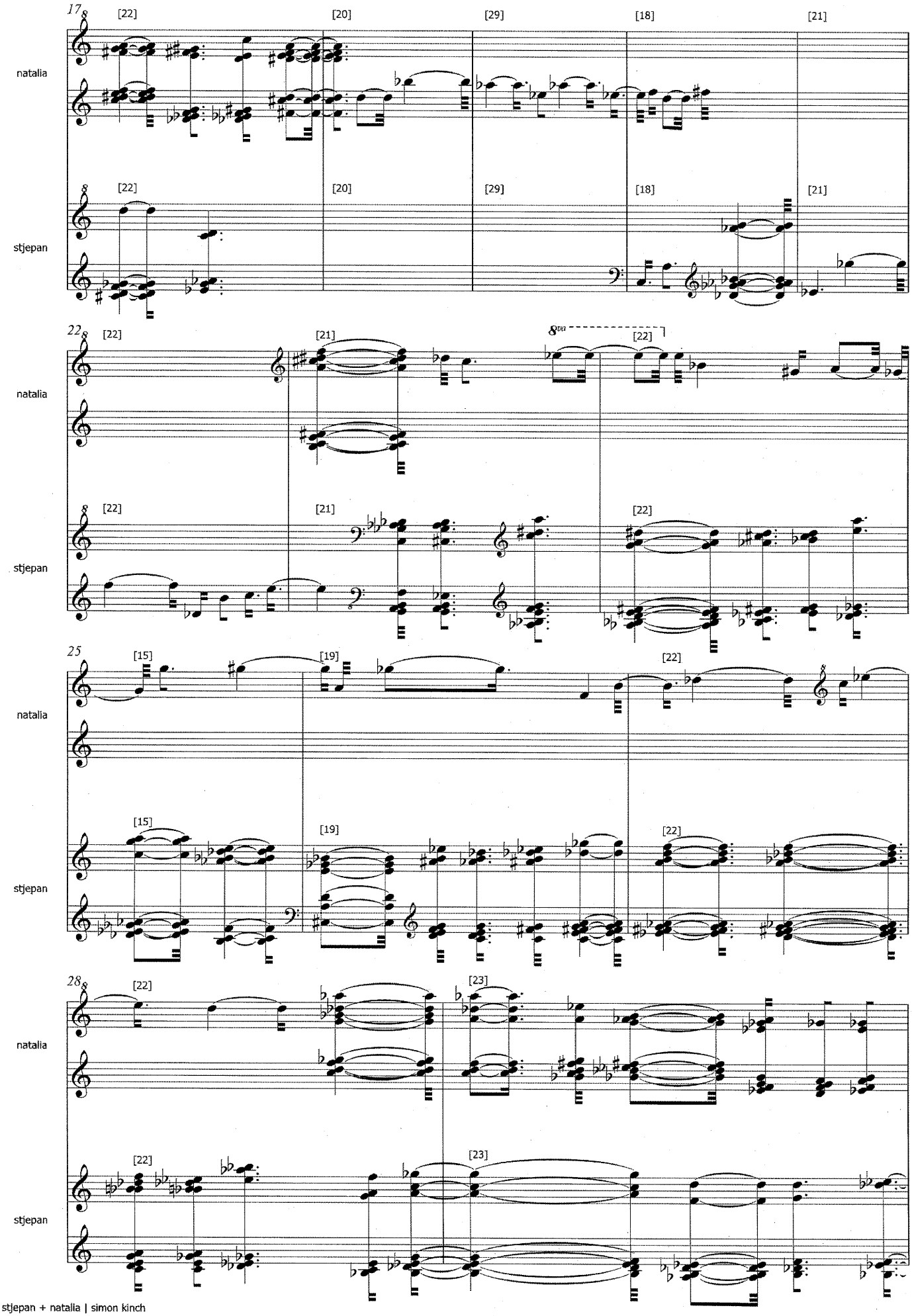
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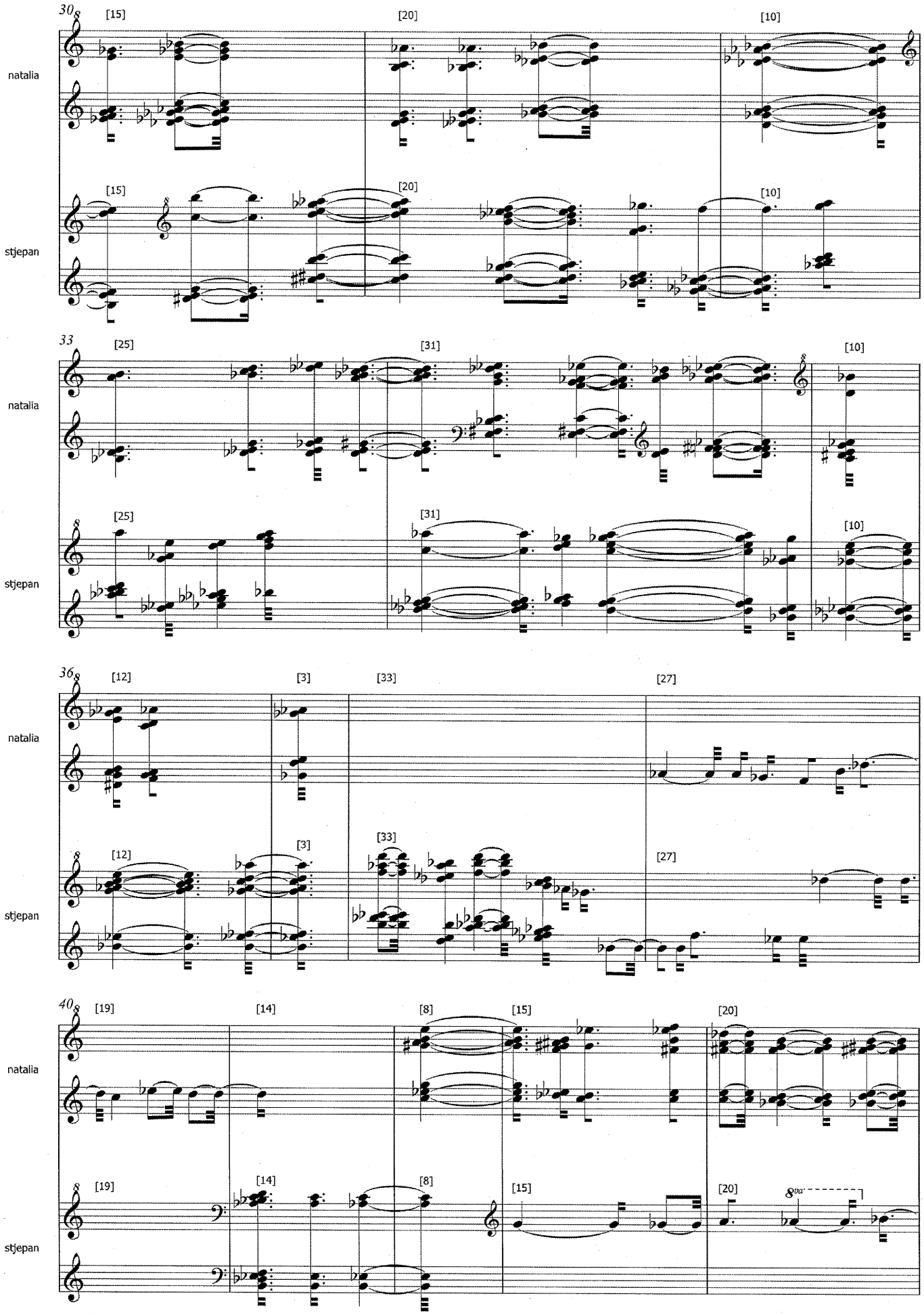
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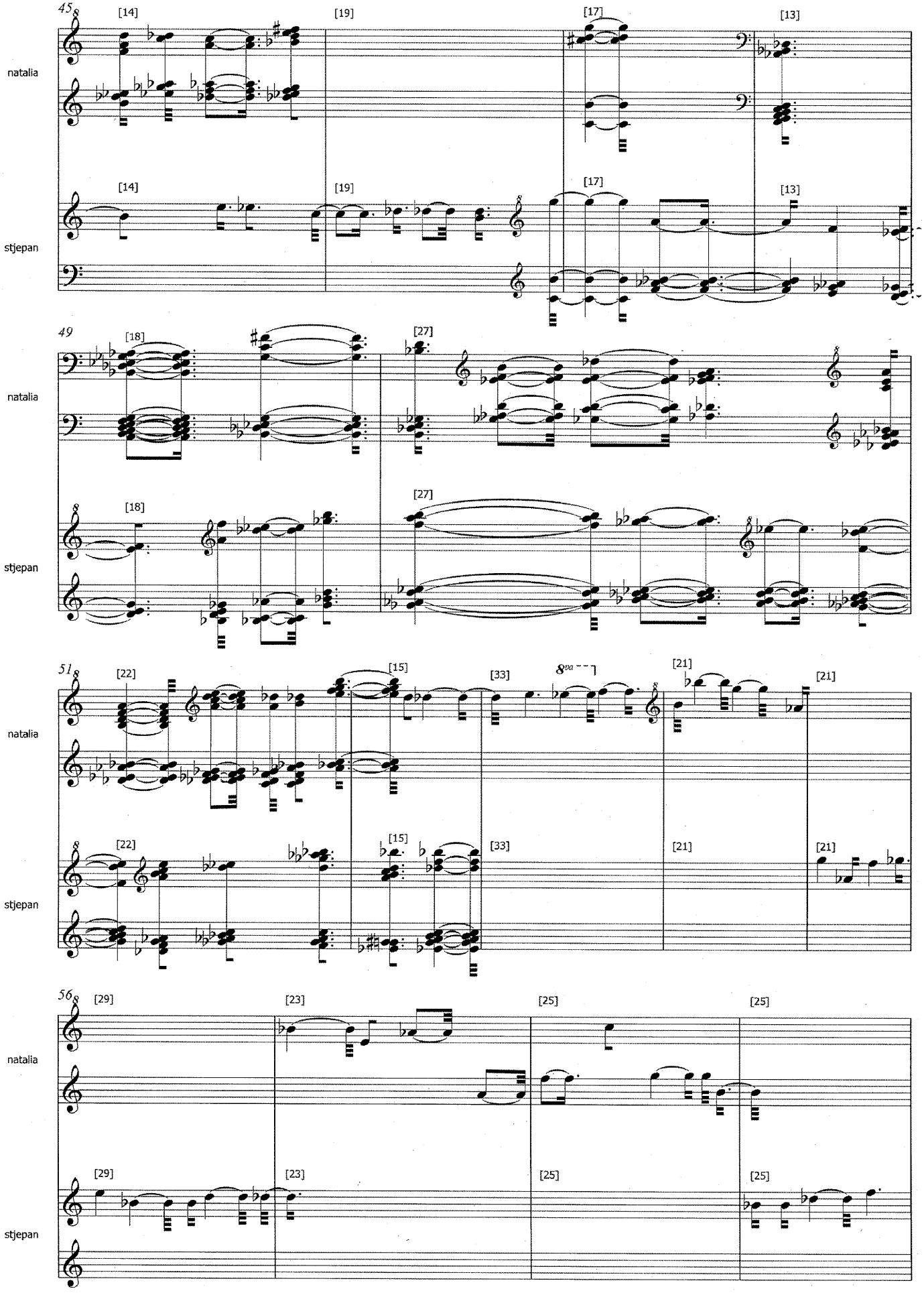
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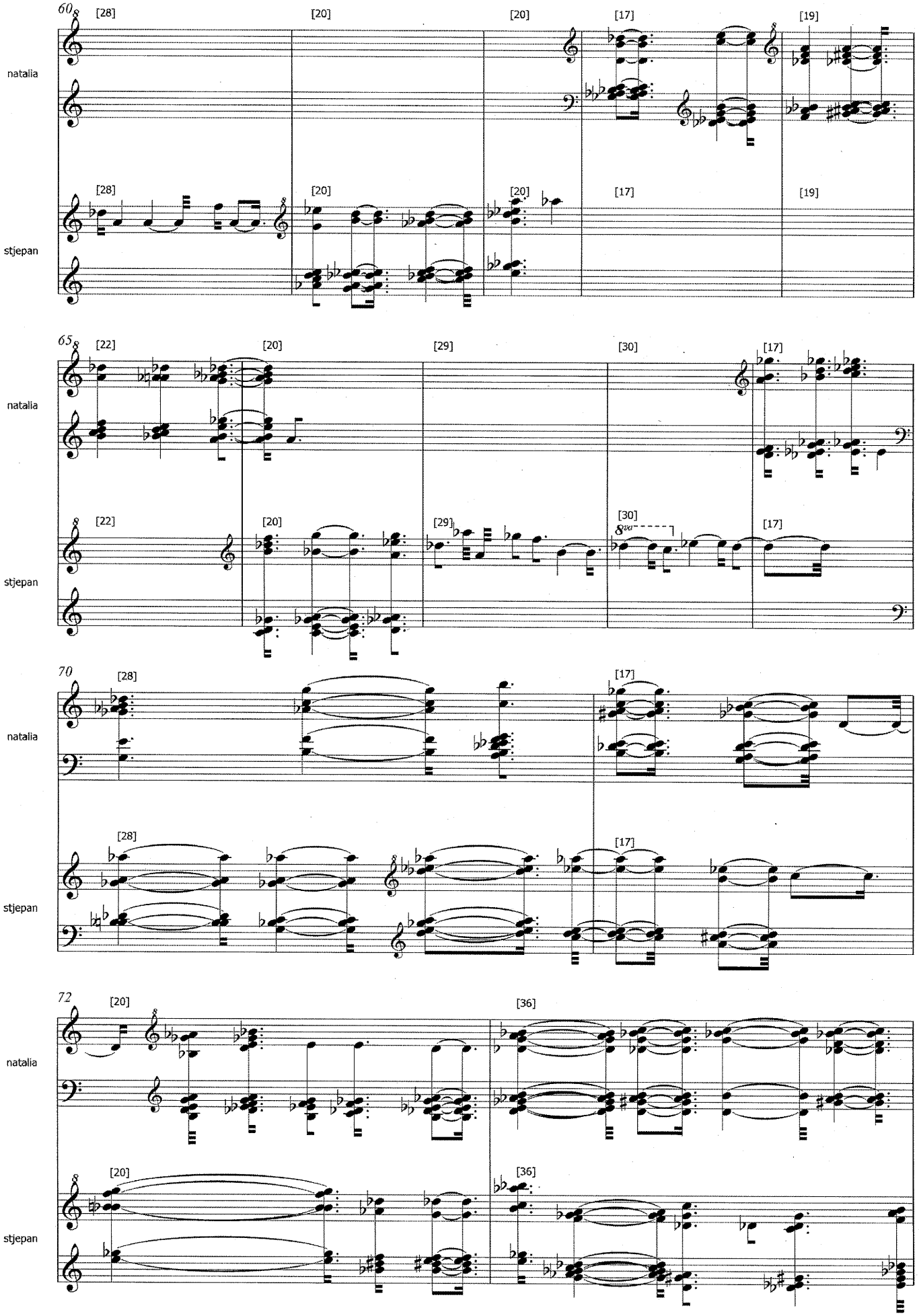
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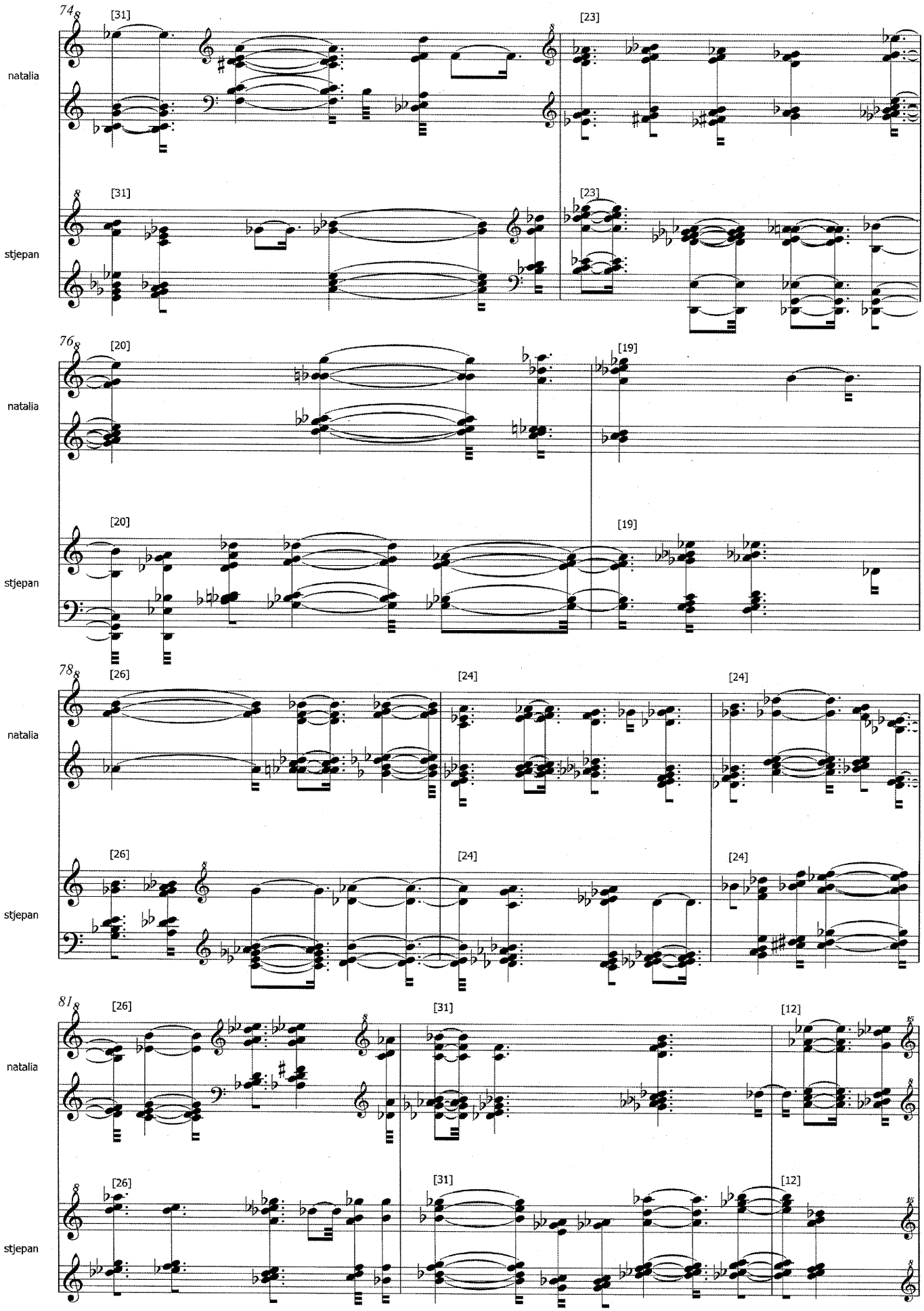
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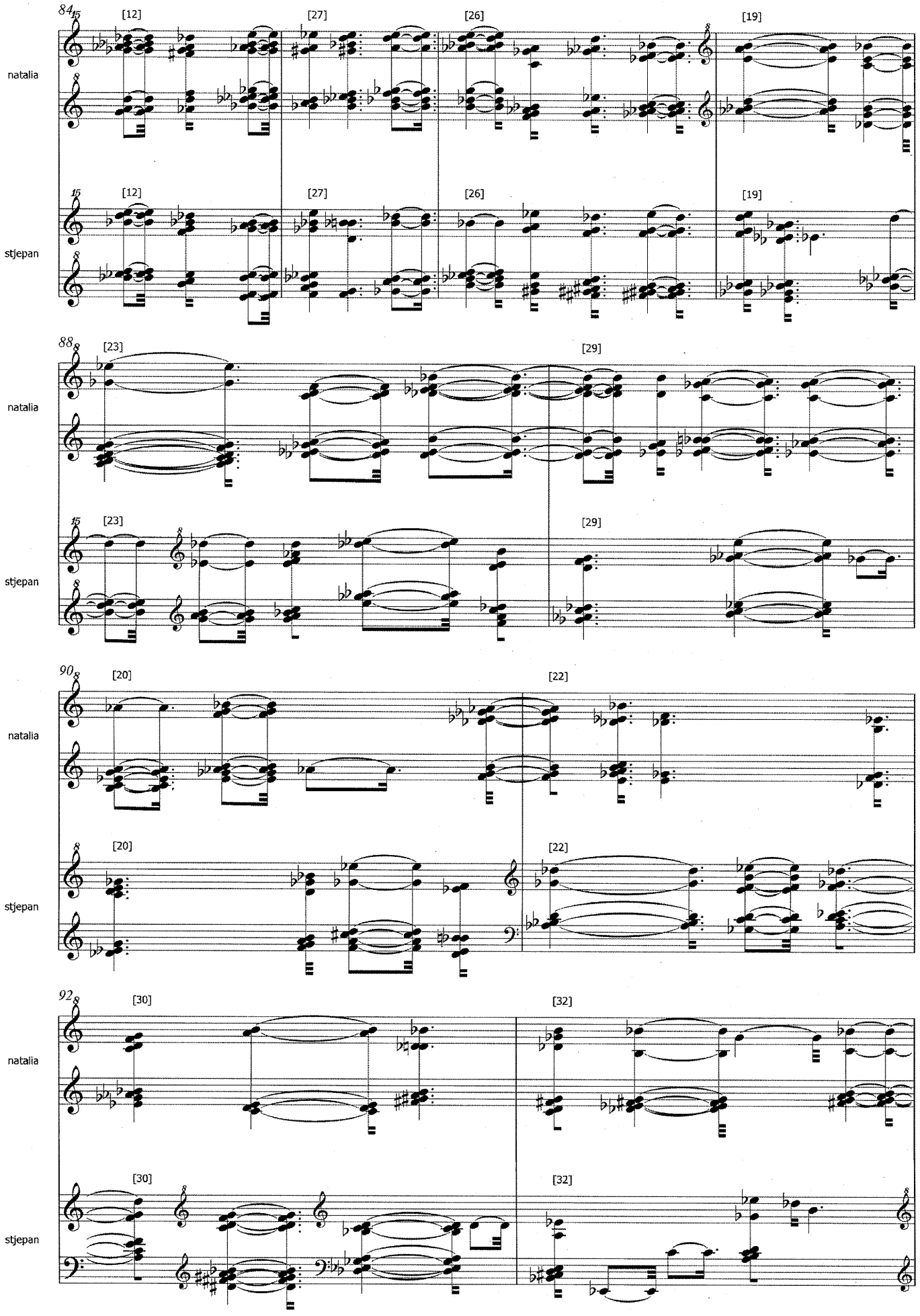
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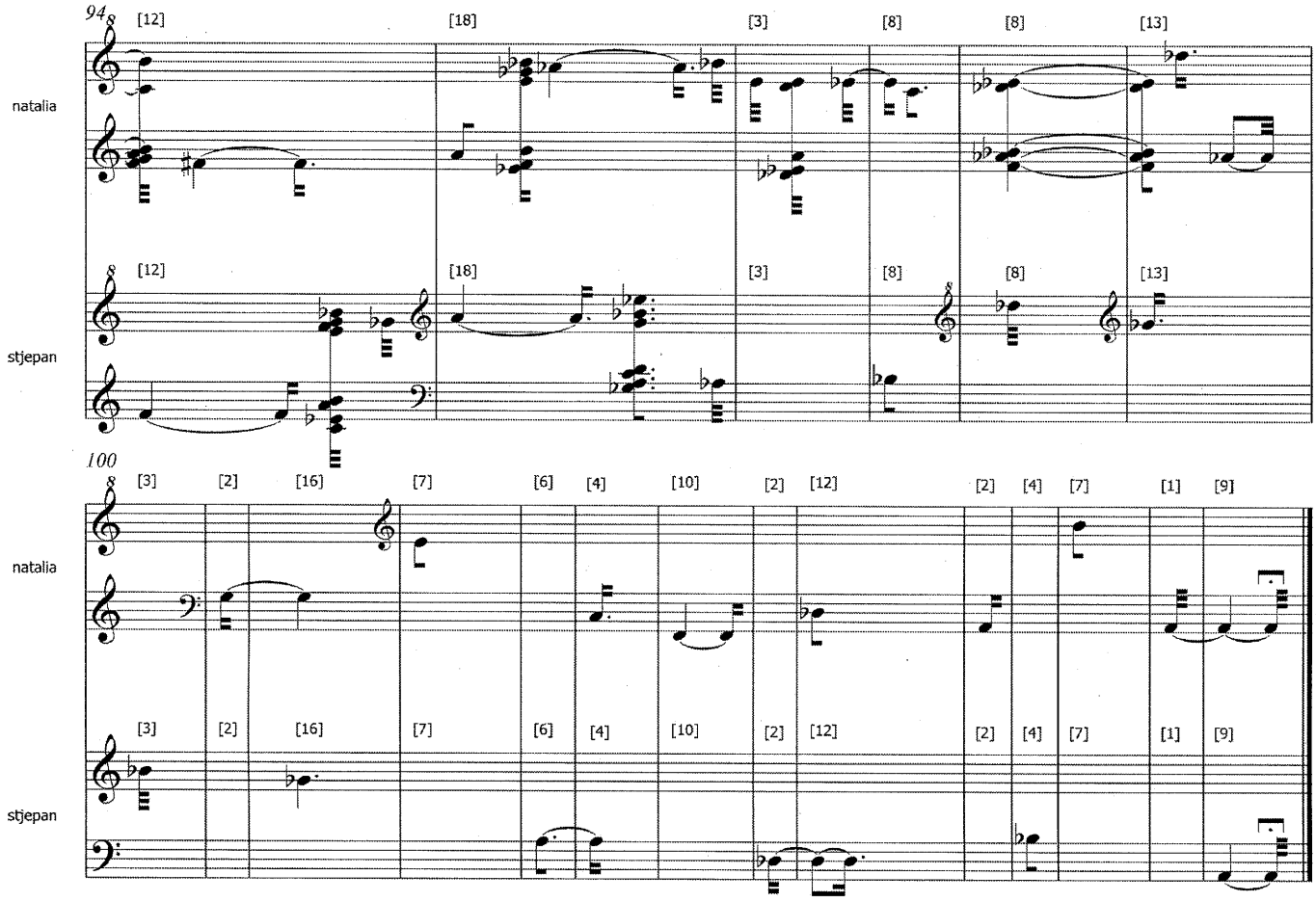
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natalia
stjepan
100
natalia
stjepan

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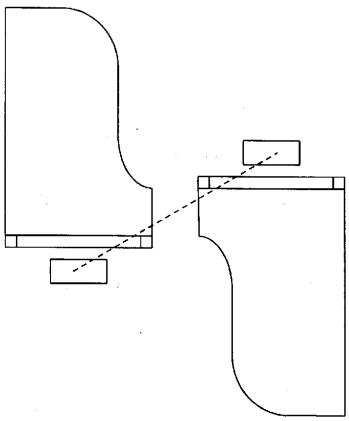

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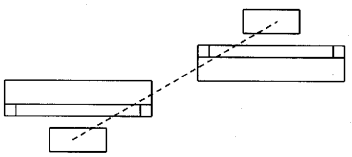

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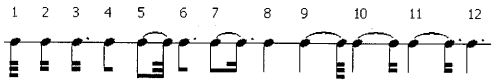
Time Signature

Conventional time signature is replaced by square-bracketed numbers above the start of each bar, denoting the number total demisemiquavers in each bar.

The beam groupings of chords or notes of any given length are notated consistently as below throughout the piece to make the recognition of each duration easier.

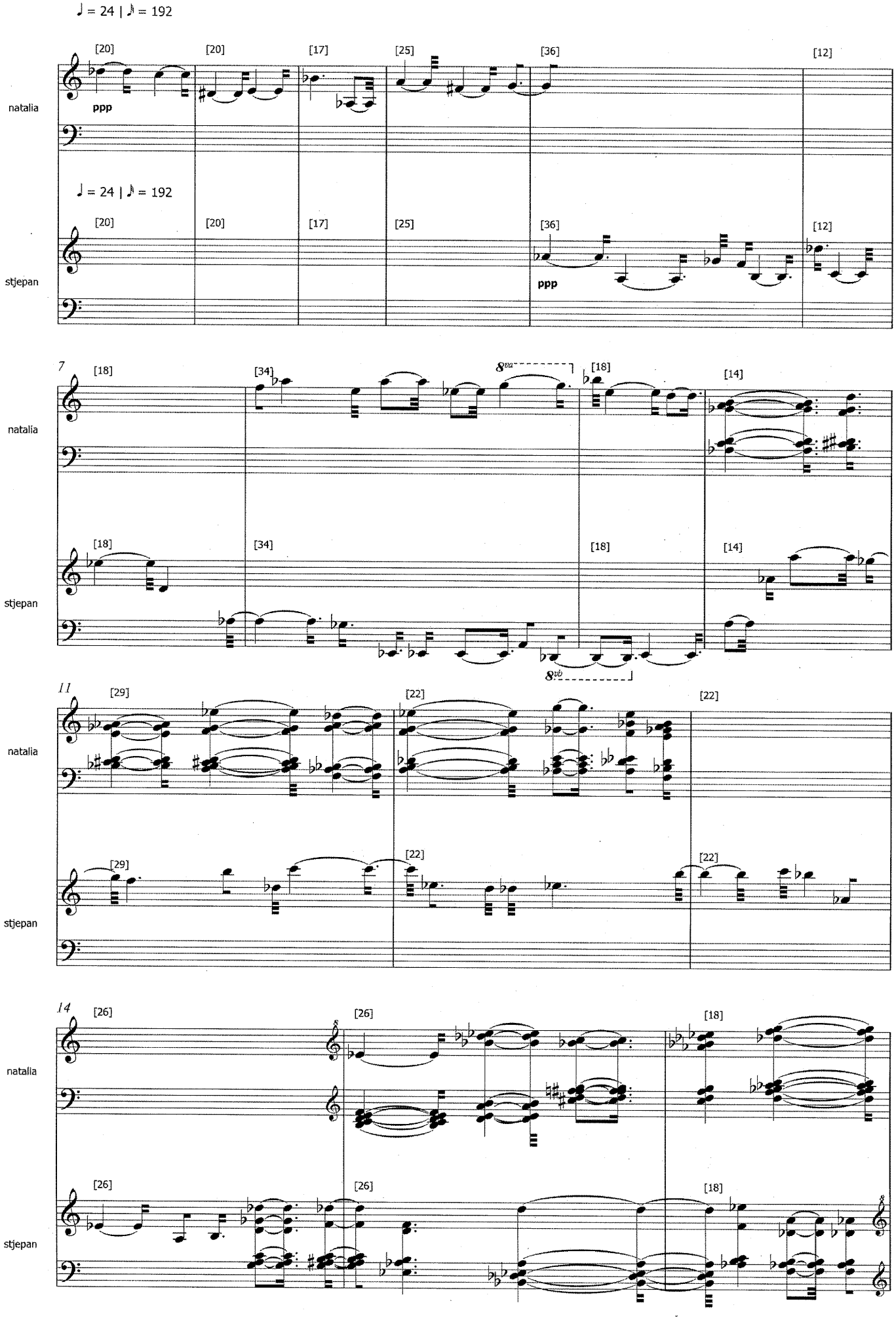
Duration in demisemiquavers:

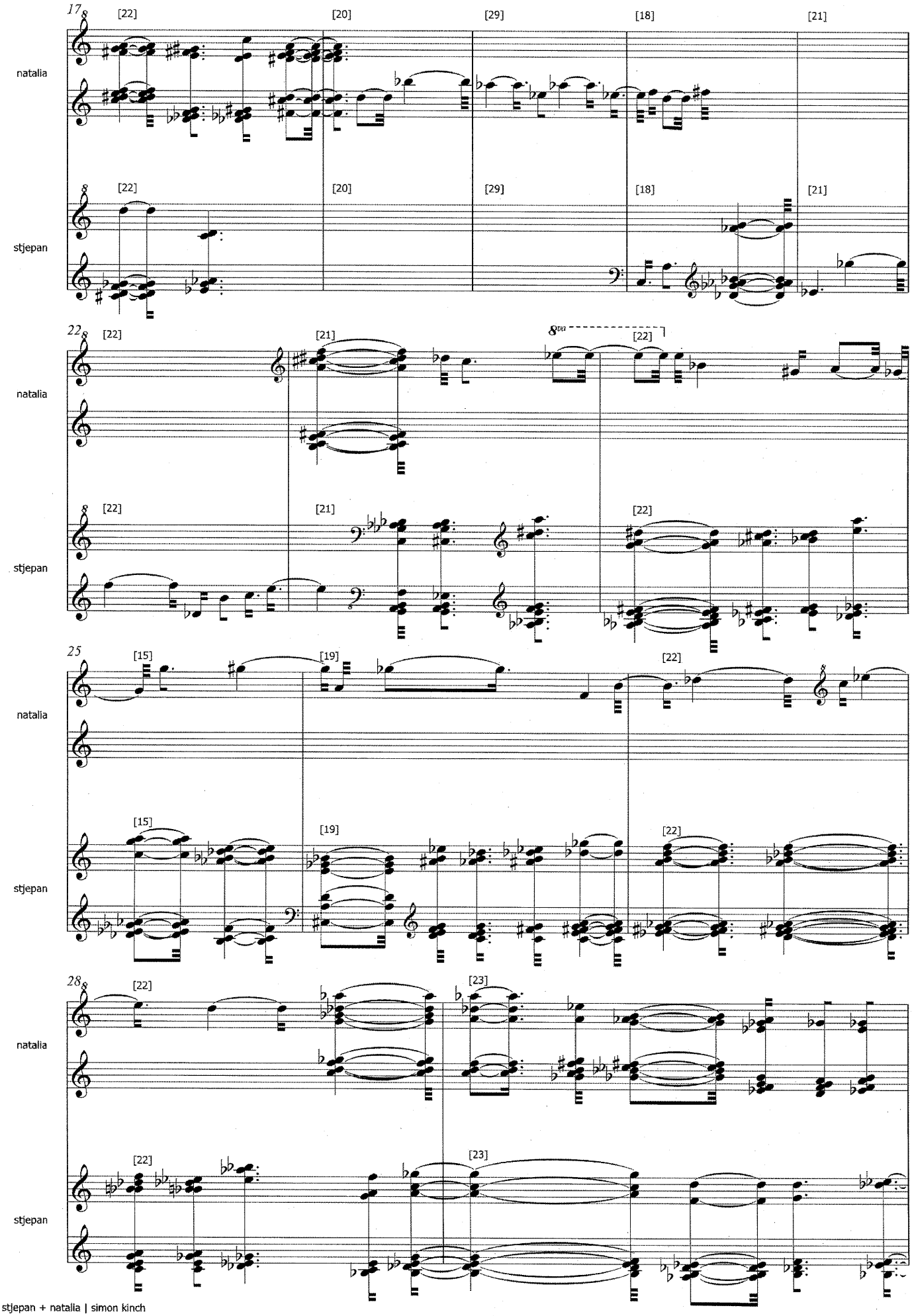


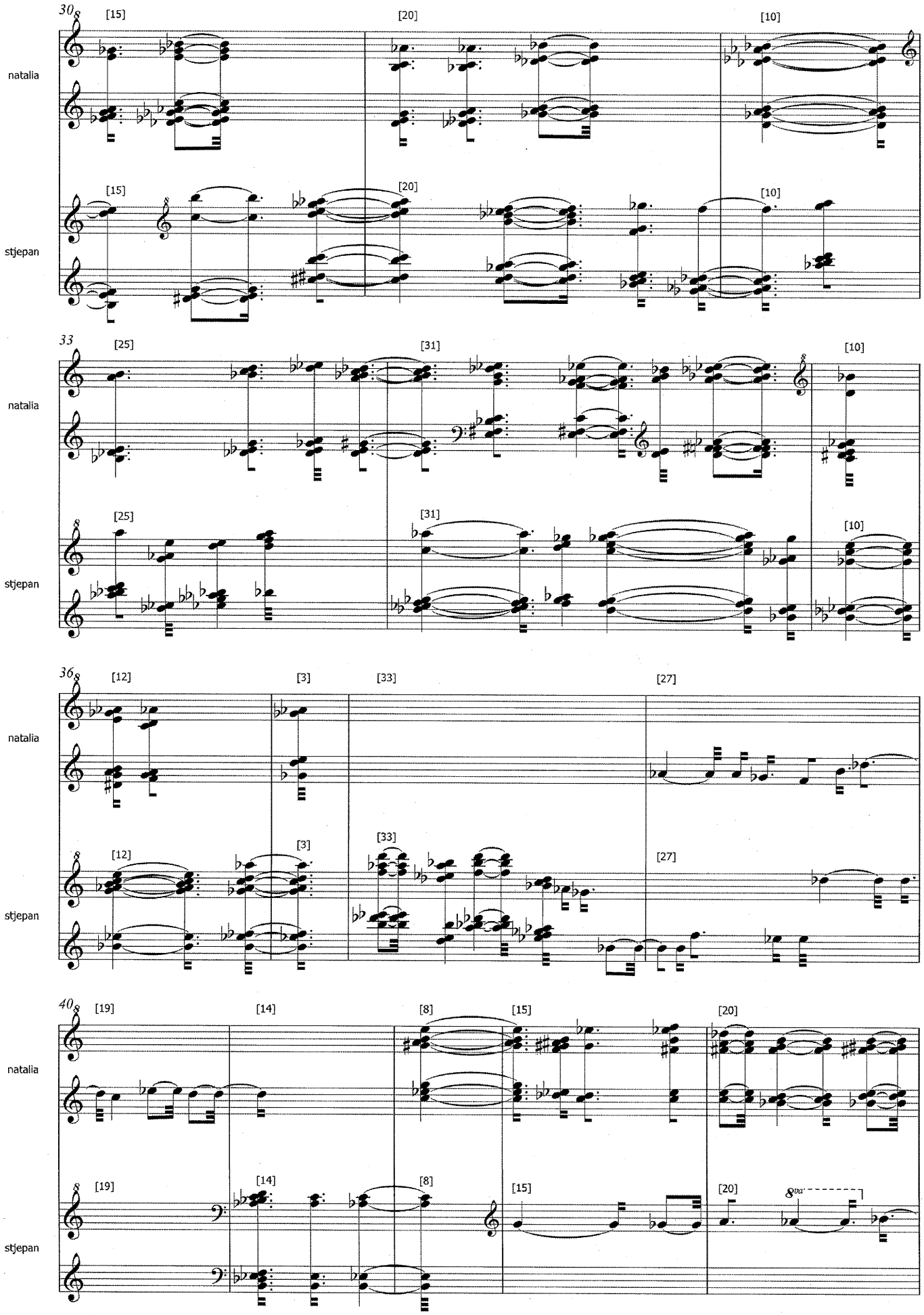
Rests

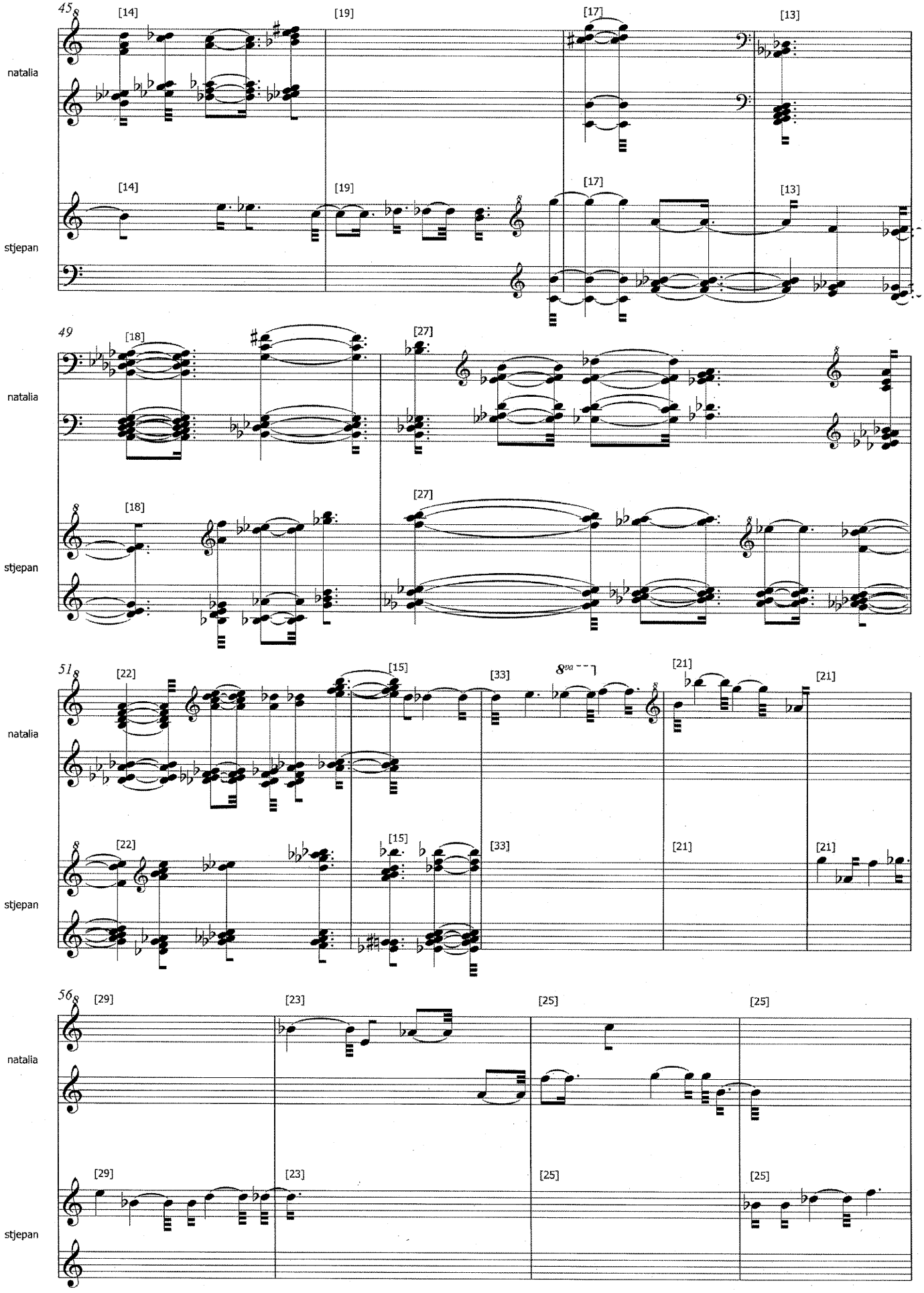
Rests are omitted from the score in favour of white-space – empty bars denote bars of rest, and bars where the total duration of notes is less than the denoted time signature are considered to end with rests.

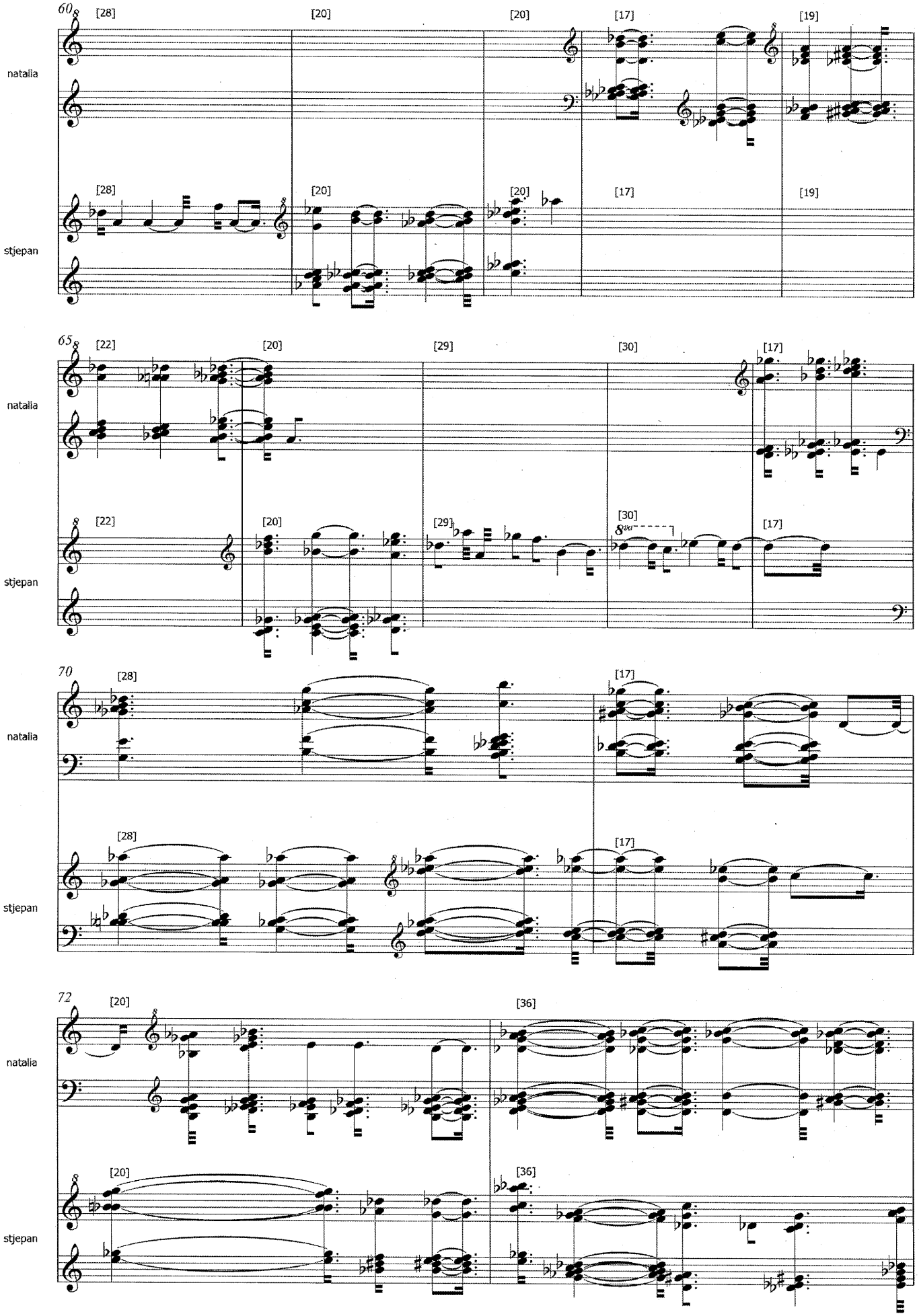
No notes within either Stjepan or Natalia's individual parts overlap, so each full note length must be realised before moving on directly to the next.

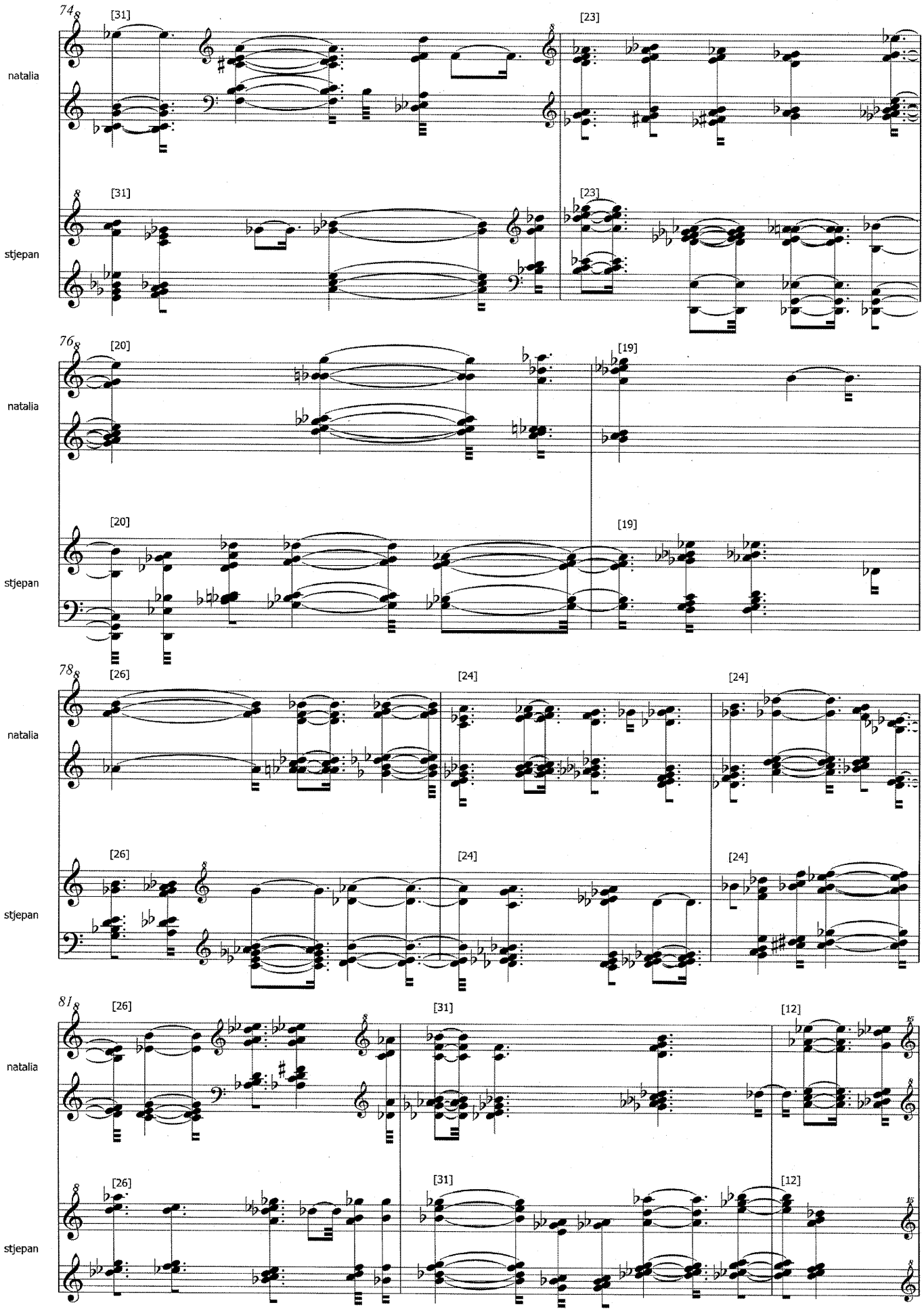

♩ = 24 | ♪ = 192
natalia
stjepan
ppp
7
11
14
8va
8vb

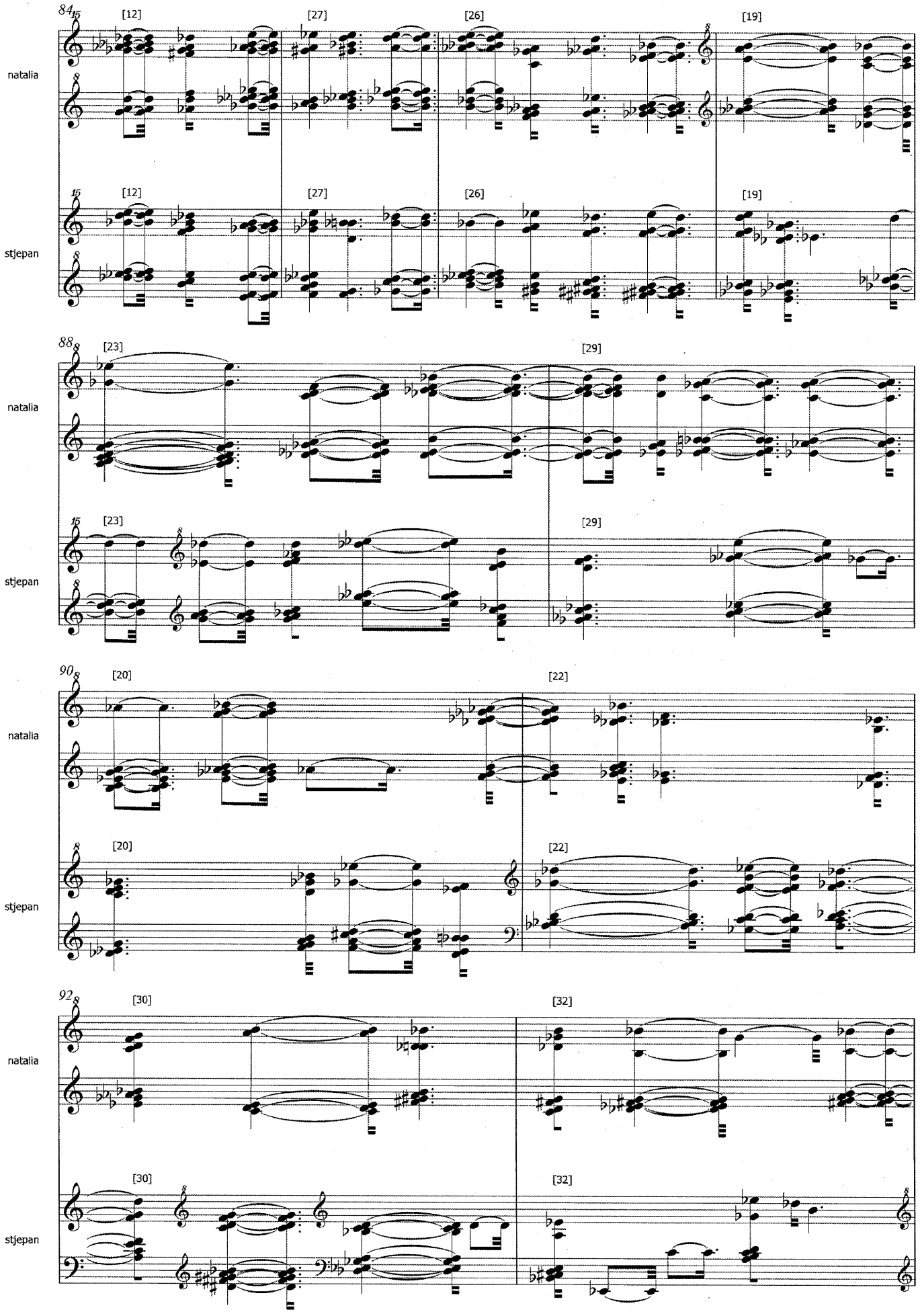

17
[22]
[20]
[29]
[18]
[21]
natalia
stjepan
22
[22]
[21]
8va
[22]
25
[15]
[19]
[22]
28
[23]

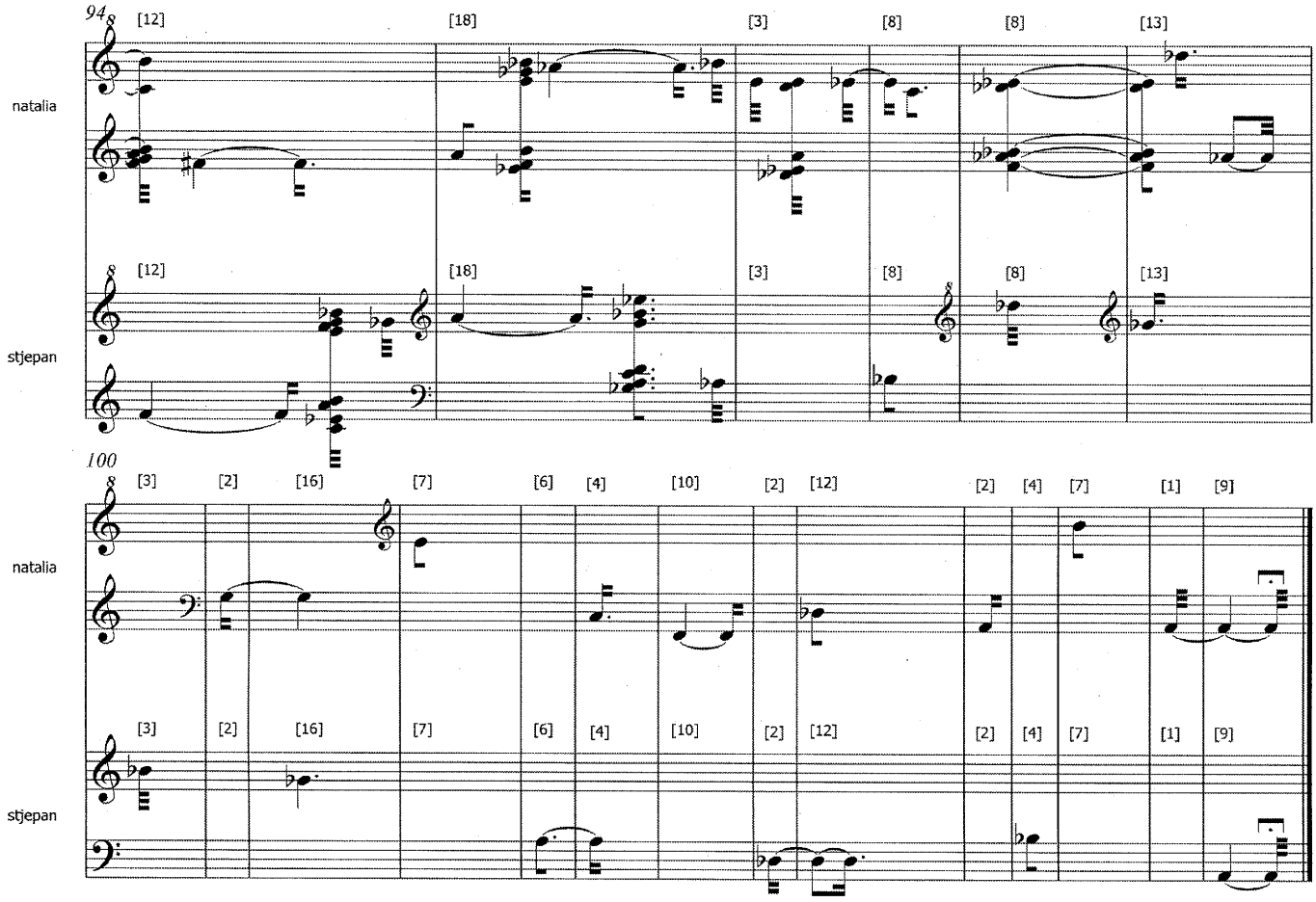

30
[15]
[20]
[10]
natalia
[15]
[20]
[10]
stjepan
33
[25]
[31]
[10]
natalia
[25]
[31]
[10]
stjepan
36
[12]
[3]
[33]
[27]
natalia
[12]
[3]
[33]
[27]
stjepan
40
[19]
[14]
[8]
[15]
[20]
natalia
[19]
[14]
[8]
[15]
[20]
8va
stjepan


45
[14]
[19]
[17]
[13]
natalia
[14]
[19]
[17]
[13]
stjepan
49
[18]
[27]
natalia
[18]
[27]
stjepan
51
[22]
[15]
[33]
8va
[21]
[21]
natalia
[22]
[15]
[33]
[21]
[21]
stjepan
56
[29]
[23]
[25]
[25]
natalia
[29]
[23]
[25]
[25]
stjepan


60
[28]
[20]
[20]
[17]
[19]
natalia
[28]
[20]
[20]
[17]
[19]
stjepan
65
[22]
[20]
[29]
[30]
[17]
natalia
[22]
[20]
[29]
[30]
8va
[17]
stjepan
70
[28]
[17]
natalia
[28]
[17]
stjepan
72
[20]
[36]
natalia
[20]
[36]
stjepan


74
[31]
[23]
natalia
[31]
[23]
stjepan
76
[20]
[19]
natalia
[20]
[19]
stjepan
78
[26]
[24]
[24]
natalia
[26]
[24]
[24]
stjepan
81
[26]
[31]
[12]
natalia
[26]
[31]
[12]
stjepan


84
[12]
[27]
[26]
[19]
natalia
stjepan
88
[23]
[29]
90
[20]
[22]
92
[30]
[32]


94
natalia
stjepan
100
natalia
stjepan